Towards improved reporting on primary forests

**Collection of contributions received**

Table of Contents

Topic note 3

Contributions received 5

1. Murungi Jonan, Agroecology advisor, Uganda 5

2. Mostafa Jafari, RIFR/ IPCC/IUFRO/ TPS for LFCCs, Iran (Islamic Republic of) 5

3. Mostafa Jafari, RIFR/ IPCC/IUFRO/ TPS for LFCCs, Iran (Islamic Republic of) 5

4. AMM Zowadul Karim Khan, FAO (formerly), Bangladesh 5

5. Saud Al Farsi, FAO, Oman 6

6. Aklilu Nigussie, Ethiopian Institutes of Agricultural Research, Ethiopia 7

7. FAO Publications 7

8. Brice Dzatini, Point focal FRA 2020 République du Congo, Congo 8

9. Terfa Olani, Wondo genet College, Ethiopia 8

10. Patrick Norman, facilitator of the consultation 9

11. Sonja Oswalt, USDA Forest Service, United States of America 9

12. Zoltan Kun, Wild Europe, Hungary 10

13. Christelle Vancutsem, European Commission, Joint Research Centre (JRC), Directorate D - Sustainable Resources - Bio Economy UnitItaly 11

14. Mila Alvarez Ibanez, US Department of Agriculture, Forest Service, United States of America 12

15. Patrick Norman, facilitator of the discussion 13

16. Ruslan Lamberto Ndje Nzo Angue, Ministerio de Agricultura, Ganaderia, Bosques y Medio Ambiente, Equatorial Guinea 14

17. Philomena Tuite, Kenya 14

18. Leonardo Daniel Boragno Rodriguez, Dirección General Forestal- Ministerio de Ganadería Agricultura y Pesca, Uruguay 15

19. Kari T. Korhonen, Luke, Finland 16

20. KBN Rayana, JNU &IAMMA Institute of Agric. Mktg, Mgt., & Admin, India 16

21. Andrei Iugov, ФБУ ВНИИЛМ, Russian Federation 17

22. Claudiu Zaharescu, Ministry of Environment, Waters and Forests, Romania 18

23. Jing Yang, FRA National Correspondent, China 19

24. Blaise Bodin, Secretariat of the CBD, Brazil 21

25. Patrick Norman, Griffith University, Australia 23

26. Helga Vierich-Drever, Yellowhead Tribal College, Canada 23

# Topic note

The Food and Agriculture Organization of the United Nations (FAO) Global Forest Resources Assessment (FRA) provides essential information for understanding the extent of the world’s forest resources, their condition, management and uses. Data collected through the FRA reporting process are used to report on progress towards globally agreed targets and inform policy and decisions by governments, civil society and the private sector. Therefore, concepts, definitions and methods developed for the FRA have broad influence beyond the process itself and must therefore be carefully developed to ensure they can be implemented consistently by as many actors as possible. This on-line consultation contributes to improvements of guidance and methods for reporting comparable global information for primary forest area and its changes.

The FRA requests countries to report on the extent of their forests for several different types of forests. One of these types is “Primary forest” which is defined by FAO as “**Naturally regenerated forest of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed**” ([Terms and Definitions, FRA 2020](http://www.fao.org/3/I8661EN/i8661en.pdf)).

While the definition of primary forest may be broadly accepted, consistently measuring the actual area of primary forest among countries has proven to be challenging. Studies have shown considerable variation in how countries apply the definition in their own circumstances, which raises questions about the comparability of the data among countries and its applicability for informing policy and decisions. In addition, other recent studies have suggested new methods to assess the area of primary forest that might be broadly applicable among many countries. Fostering discussion and debate around definition and operational methodology for the assessment of primary forest are key to promoting accurate and consistent global reporting to assess progress toward global objectives such as Aichi Biodiversity Target 5 forest-related goals and targets under the Post-2020 Global Biodiversity Framework, Sustainable Development Goal 15 and the goals of the United Nations Strategic Plan for Forests 2017-2030.

Therefore, the FAO has undertaken to bring together FRA National Correspondents and other experts through a series of workshops to improve the operational methods for data collection and reporting on the extent of primary forests. The goal of these workshops is to increase the consistency of data collection methods and enhance the comparability among countries of estimates of the extent of primary forests. The workshops will be conducted in the course of 2020-2021 in different regions based on ecological, geographical, language and forest management differences in primary forests. The first workshop, for the boreal biome, is scheduled for March 17-19, 2020 in Ottawa, Canada.

In order to facilitate discussion at these workshops, a [**background paper**](http://www.fao.org/fsnforum/sites/default/files/files/163_Primary_Forests/DRAFT_Primary_Forest_Report_12Feb20.pdf) is being prepared, summarizing how the extent of primary forest has been assessed to date, identifying emerging methods that might provide useful alternatives to existing methods, and providing options for workshop participants to discuss.

The paper presents

1. A review and assessment of definitions relating to primary forests;
2. A review of how primary forest has been reported in FRAs to date;
3. An evaluation of datasets and methods currently available for mapping primary forests and estimating their condition, area and trends; and
4. Options for future defining, assessing and reporting on primary forests.

Through this e-consultation, FRA National Correspondents, Secretariats of the Rio Conventions, Civil Society and other stakeholders are kindly invited to comment the background paper draft. The received feedback will contribute to the preparation of the final version of the [background paper](http://www.fao.org/fsnforum/sites/default/files/files/163_Primary_Forests/DRAFT_Primary_Forest_Report_12Feb20.pdf), which will be presented during the regional primary forest workshops.

When providing your feedback, kindly reply to the following guiding:

1. Is the FAO definition on primary forest ([FAO, 2018](http://www.fao.org/3/I8661EN/i8661en.pdf)) adequate to your national/regional/global assessment and reporting purposes? If not, what criteria would you like to add/remove from the FAO definition?
2. Is the background paper missing any major issues? If yes, please specify.
3. Which methodology and data, if any, do you use to assess primary forest area and its changes?
4. Which methodological changes would be needed to improve reporting on primary forest area and its changes at national, regional and global levels, with particular emphasis on improving consistency among countries?
5. How can FAO help countries improve their reporting on primary forest?

# Contributions received

## Murungi Jonan, Agroecology advisor, Uganda

Assessment should be based on policies that streamline activities in forest industry because some native forest resources are depleted by Human Activities such as increase in population. GPS based methodology should be employed to improve reporting, deploying forest rangers mainly in developing countries who can monitor changes in forest dynamics

## Mostafa Jafari, RIFR/ IPCC/IUFRO/ TPS for LFCCs, Iran (Islamic Republic of)

Forest in arid and semi- arid regions are very important.

Low forest cover countries which mainly are located in dry area need to be considered in such program.

Primary forests' definition has to be based on ecological characteristics.

But definition provided by FAO and UNFCCC could be used partly of each.

5% cover and above 2m height tree.

## Mostafa Jafari, RIFR/ IPCC/IUFRO/ TPS for LFCCs, Iran (Islamic Republic of)

Climate change is very important issue which must be considered for mitigation and adaptation, but it is not necessary part for definition of primary forests, as mentioned in UNFCCC document.

## AMM Zowadul Karim Khan, FAO (formerly), Bangladesh

1. FAO definition of forest is fine. However, land management system of a country may not use that definition. In Bangladesh a forest is simply a forest land as declared and protected by the government /forestry department. In my opinion 0.5 ha seems too less to be considered as realistic. It might be considered as 1 ha.
2. The background paper lacks readibility. It might be more reader-friendly. So that it can be used as an advocacy tool.
3. Primary forest area is simply changed by deforestation, ie, when the forest area is encroached. Sometime forest area is encroached by government (government structute, army installations etc). Then no remedy.
4. No comment.
5. Also, no comment.

Thanks.

## Saud Al Farsi, FAO, Oman

Towards improved reporting on primary forests

1. Is the FAO definition on primary forest (FAO, 2018) adequate to your national/regional/global assessment and reporting purposes? If not, what criteria would you like to add/remove from the FAO definition?

We have to include (add) the following topics in the definition:

* The age of the forest trees.
* The trees don’t belong to invasive species in the forest area (invasive species destroy the native trees).
* The forest trees must be native trees of the same geographical region.
* Tropical, subtropical arid zone forest …. etc.

2. Is the background paper missing any major issues? If yes, please specify.

Yes

In the section of Measuring primary forest (line 299), I prefer to classify the forest based on using hyperspectral satellite images (250 bands) and creating a spectral finger print for each and every species (trees, bushes …etc.) in the forest. This will be very helpful for local, regional and global level forest modeling prediction, monitoring, and change detection of the primary forest.

3. Which methodology and data, if any, do you use to assess primary forest area and its changes?

1. Delineate the forest by Aerial photography or satellite imagery.
2. Classify the trees density and species using GIS & RS programs.
3. Model, Protect and Monitor the forest area from any degradation.

4. Which methodological changes would be needed to improve reporting on primary forest area and its changes at national, regional and global levels, with particular emphasis on improving consistency among countries?

1. Harmonize the low, rules, policies …etc. this will help in reporting for national and regional level.
2. Harmonize the data set file formats between the countries, to facilitate the analysis of data for regional and global levels.
3. On national level, we have to centralize this mission for one institute.

5. How can FAO help countries improve their reporting on primary forest?

1. Including Geographical Information System (GIS) and Remote Sensing (RS) technique in the country reporting.
2. Train the country staff on how to differentiate between primary forest and non-forest (botanic gardens, pasture area …etc.) using GIS & RS.
3. Inviting the country staff for Workshops / regional and international conferences.

## Aklilu Nigussie, Ethiopian Institutes of Agricultural Research, Ethiopia

1. It looks great and it has a similarity to my nation of Ethiopia, but can we call weeds like Prosopis juliflora a forest that covers more than 0.5 ha of land, higher than 5 meters? A specific place like the Afar region of Ethiopia, ranges are covered with such a weed type tree.

2. I think the background only miss clarification like the ground condition with pieces of literature, the other is the best

4. For trend estimate quadrant estimation will be good for few years, then arranging an index can be advisable, at last having a conversion factor of environmental variability, disease and others might be advisable, at last, it will be easy to forecast applying simulation method will be good

5. Capacitate human resources, organize funds and use Capi-based data collection methodology that can be tracked with satellite GPS and easily converted the data to the database system.

## FAO Publications

Here is a selection of titles proposed by FAO Publications for Forum participants who would like to read more on forest reporting.

[Seventy years of FAO’s Global Forest Resources Assessment (1948–2018). Historical overview and future prospects](http://www.fao.org/documents/card/en/c/I8227EN)

Launched in conjunction with a new online platform for forest reporting, this publication retraces the history of the Global Forest Resources Assessment, from the first in 1948 to more recent reports, which adopt a more comprehensive approach to address all aspects of sustainable forest management.

[FRA 2020 terms and definitions](http://www.fao.org/3/I8661EN/i8661en.pdf)
This document contains a comprehensive list of terms and definitions as well as explanatory notes for FRA 2020 reporting variables.

[FRA 2020 guidelines and specifications](http://www.fao.org/3/I8699EN/i8699en.pdf)
This document provide information about the country reporting process, including an introduction to the new FRA 2020 on-line reporting platform.

[Trees, forests and land use in drylands: The first global assessment. Full report](http://www.fao.org/documents/card/en/c/ca7148en)This publication provides a comprehensive overview of forest and tree resources as well as land use in the drylands of the world.

[The State Of The World’s Forests 2018. Forest pathways to sustainable development](http://www.fao.org/documents/card/en/c/I9535EN)The 2018 edition of the State of the World's Forests provided new information on the interlinkages between forests and trees and the Sustainable Development Goals, shedding light on their significance for water quality, climate, biodiversity, future energy needs and designing sustainable cities.

[Global Forest Resources assessment 2015. How are the world’s forests changing?](http://www.fao.org/documents/card/en/c/770b9ce6-9f65-4a46-a9af-1abbb0f71ab1)Building on comprehensive data covering 234 countries and territories, the last edition of this five-yearly report showed that over the previous 25 years the rate of net global deforestation had slowed by more than 50 percent.

[Global Forest Resources Assessment 2015. Desk reference](http://www.fao.org/documents/card/en/c/f262f48b-fe70-46c8-9cf3-fd18119c9c3e)

This desk reference provides the data reported by countries for the Global Forest Resources Assessment (FRA) 2015. Presented in easy-to-consult tabular form, it is a useful companion to the main report.

*Forthcoming publications*

[Global Forest Resources Assessment 2020](http://www.fao.org/forest-resources-assessment/en/) – Key findings
The key findings from the Global Forest Resources Assessment 2020 contains key messages about forest resources, supported by graphs and figures. This summary document will precede the launch of the full report later in the year.
(Launch: end of April 2020)

[Global Forest Resources Assessment 2020](http://www.fao.org/forest-resources-assessment/en/) – Main report
The main objective of Global Forest Resources Assessment 2020 is to inform the public about the state of the forest resources at global, regional and national levels.
(Launch: Committee on Forestry 2020, 22−26 June 2018, FAO headquarters, Rome)

[The State of the World's Forests 2020](http://www.fao.org/publications/sofo/en/)
This series covers the status of forests, policy and institutional developments, and other key issues concerning the forest sector. It shares current, reliable and relevant information to facilitate informed discussion and decision-making. This year’s edition will focus on biodiversity.
(Launch: [Twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity](https://www.cbd.int/meetings/SBSTTA-24), 18−23 May 2020, Montreal)

## Brice Dzatini, Point focal FRA 2020 République du Congo, Congo

**Original contribution in French**

De mon côté je suggère que la FAO puisse revoir la définition de la forêt. Avec l inventaire forestier national réalisé en République du Congo avec l appui de la FAO la forêt avec 0,5ha. 10% du couvert d arbustes et les arbres devraient atteindre 5metre d hauteur... Mais avec le dérèglement climatique et avec le processus REDD+ et le crédit carbone beaucoup des pays définissent leur forêt avec 3m d hauteur d arbre et 30% du couvert et la superficie de 0,5ha. Car les arbres ou arbustes de 3metre séquestre le carbone. Donc une bonne réflexion reste primordiale surtout de ce qui est aussi une forêt primaire.

Brice Dzatini , point focal FRA 2020 République du Congo

**English translation**

Personally, I suggest that FAO could review the definition of the forest. With the national forest inventory carried out in the Republic of Congo with the support of FAO, the forest should be of 0.5ha, 10% bush cover and trees should reach 5 meters high.

But with climate change and the REDD+ process and carbon credit, many countries are defining their forest with trees of 3m height and 30% of the cover and an area of 0.5ha.

Indeed trees or bushes of 3 meters capture carbon. So a good reflection remains essential especially for what is also a primary forest.

Brice Dzatini , FRA 2020 Focal Point Republic of Congo

## Terfa Olani, Wondo genet College, Ethiopia

1. FAO definition of forest is good for me as an expert, but it is different my country definition and if possible the definition must the same as a world to compare our primary data of forest at worldwide.

2. It is good to add some literatures of primary forest rich area to acknowledge some countries

3. Use the newest and clear Land sat if possible

4. Data collection and forest resource inventories must start at true and reflected area and no need of any calculation to replace the forest left on other area

5. Cross checking and financing them

## Patrick Norman, facilitator of the consultation

Dear members of the FRA Forum,

Thank you to those that have already posted their feedback in the early stages of the consultation process. The contributions so far have provided valuable insights into the different methods used to measure primary forest cover (e.g. Landsat and aerial imagery; calculating tree densities and tree species cover; excluding areas around human impact areas) as well as methodological changes required to improve reporting (e.g. Harmonizing datasets and reporting rules; ensuring all forest areas are initially assessed). The current definition of primary forest generally appears to be well accepted by those who have contributed feedback, although issues around non-native forests being defined as primary forest is seen as an important consideration.

Also, the comments about the draft background paper have been very useful. The need for clarification about on ground condition assessment, primary forest detection methods and increasing the papers readability have been suggested.

Many thanks to those who have contributed so far. We welcome further inputs and reactions, as well as encouraging future contributors to refer as much as possible to the four guiding questions in the topic note.

Kind regards,

Patrick Norman

Griffith University

## Sonja Oswalt, USDA Forest Service, United States of America

Dear Team,

Congratulations on tackling this difficult issue. I'm thrilled to see it on the docket as an important topic for FAO, and I am very appreciative of the opportunity to read the paper and respond.

1. The current primary forest definition is not adequate for North America if we wish for the variable to be comparable in a globally meaningful way. The definition is vague without discreet measurable parameters for various biomes, leaving it largely up to interpretation of each of the correspondents to locally define the variable. While that is "fine," it means that data point is not useful at the global scale, which is the purpose of the FRA data, in my opinion. In particular, I have some of the following concerns: a) The use of the word "natural" allows for a wide range of "degrees of naturalness" to be included in the primary forest category. For example, are forests that have grown over aztec ruins considered natural? Are they Primary or Secondary? Young forests can show natural forest dynamics, natural tree species composition, and natural age structures.  b) It seems the primary concern of FAO is commercial logging operations or other commercial use (as is evidenced by  the use of the terminology "no human intervention EXCEPT native people living native lifestyles"). How far back do we go to determine who is "native" or "indigenous" to an area, and how large can their disturbance for "traditional use" be before it becomes large enough to be considered human intervention? For example, in the United States, native Americans used fire broadly to manage forests - and to eliminate them - would that have been primary forest, still?  c) if we use the approach of remotely sensed data to create a metric representing "primary" forest, I'm still not exactly sure what it is we are measuring. Are we measuring ecological function? Because some "primary" forests are likely less biodiverse or less beneficial to humans/wildlife than well-managed secondary forests. Are we measuring human footprint? Because if so, native and indigenous populations ought to be included. Are we measuring growth stage or structural complexity or species composition? Because those things are not meaningful on a global scale. If remotely sensed data shows "greening" and "heights", what about in areas where the canopy is preserved and there is an understory that appears structurally mature, but it consists of nonnative species and/or planted agricultural crops?

2. Yes. I do not understand why there isn't some space given to the "WHY WE WANT THIS" question. There are lots of discussions of who has said it's important and what definitions various groups have adopted, but not a whole lot of "here is the question we are asking and why we are asking it."  Also, I have yet to see a good explanation of why human impacts are measured UNLESS it is native populations. Who cares if the disturbance is commercial or local if the impact is the same?  What if it's commercial exploitation by indigenous peoples? I don't mean to be obtuse, but I do not understand this exemption of "native people." People are people.  Perhaps it could be reworded to exclude particular USES by ANY people - e.g., not including low-impact uses like gathering pinecones for decorative purposes or gathering firewood for local use.  b) in the section of ecological characteristics, line 208, there's discussion of native species composition and natural levels of biodiversity. How native? What level of naturalization is necessary before something is native? At what point is something considered naturalized included in the "nativity" of the forest environment? Is there some scale or percentage of naturalness that a forest need meet before it meets the "natural level of biodiversity" and what is the baseline by which that is measured? When considering "biodiversity", we find that oftentimes disturbed forests are more biodiverse than undisturbed forests - so, not all biodiversity is necessarily desireable biodiversity. To what time period to we refer to determine what level of biodiversity is optimal?

**The source for US NATIONAL REPORT statistics is NOT Alvarez et al. Please correct.**

3. The US uses the protected area database IUCN categories 1-5 as well as national parks, interior Alaska, wilderness areas, and other roadless forests.

4. We need a discreet understand of what the information is to be used for - what is the purpose of knowing the area of "primary" forest and how is it beneficial to the global community? Is the goal to re-establish or maintain some specific area of "primary" forest, and why? Someone define the question and the reason for the question, please.  I think that most likely the idea of primary forest is best addressed at the biome level rather than the global level in order to be meaningful.

5. Countries need very discreet, measurable characteristics in order to provide something useful to the environmental community, as well as a clear understanding of why the variable is important and how it will be used.

Thank you, and here's to a productive meeting in March.

Sonja Oswalt

## Zoltan Kun, Wild Europe, Hungary

I suggest using the Buchwald [hierarchical terminology](https://www.researchgate.net/publication/309428561_Buchwald_2005_A_hierarchical_terminology_for_more_or_less_natural_forests) in Europe which would make al discussion about primary forest more relevant to the European continent.

A EU member states could report also through the Forest Information System for Europe.

The European countries monitoring data should also be integrated into the regular State of Europe's Forest (SOEF) reports. However, the definition must be standardised (eg. SOEF reports on undisturbed forest, which is a very vague term).

The reports must also include changes resulted either by natural or by human disturbance. The main purpose of reporting in Europe at least is to help strengthening the protection of the remaining few primary / old-growth forests (see old-growth forest strategy [here](https://www.wildeurope.org/wp-content/uploads/2019/10/old-growth-forest-protection-strategy-outline.pdf)).

## Christelle Vancutsem, European Commission, Joint Research Centre (JRC), Directorate D - Sustainable Resources - Bio Economy UnitItaly

1. The criteria “**no clearly visible** indications of human activities…” appearing in the definition is important and adequate when considering the use of Earth Observation data to assess or map ‘primary forests’ (or proxies of primary forests). Indeed remote-sensing based approaches can allow to detect and map disturbances in the forest cover but very old or small-scale disturbances may not be ‘visible’ from such data. Historical assessments of forest cover disturbances can be based on remote sensing time series but are limited by the availability and characteristics (e.g. spatial resolution and temporal coverage) of the satellite data. Currently, for the tropical regions adequate Satellite imagery (Landsat) is not available before the year 1982 for South-America (mostly Brazil) and much later for other tropical countries (the first valid image acquisitions are often not available before 2000 in Congo-Gabon and the Gulf of Guinea). Disturbances due to human activities or natural processes that occurred before the first available images cannot be mapped in regions like the tropics where no other historical wall to wall information is available.

Consequently, we suggest the following operational definition of primary forests that can be consistent with the available historical observation data:

“ Naturally regenerated forest of native tree species, where there are no clearly visible indications of human disturbances in the last 20 years or during the period of existing observation data” similarly to the initial definition of primary forest used by FAO (“not recently disturbed forest”).

3. We have developed an approach to map “undisturbed tropical moist forests” (TMF) that can be considered as an operational proxy to primary forests in the tropical moist domain. The approach is based on the detection of tree cover disturbances visible with Landsat satellite imagery over the full archive available (from Google Earth Engine). We consider a forest as undisturbed when no disturbances are detected over the full period of available historical imagery (varying from 10 to 30 years duration according to the region).

An expert-based system allows processing the full Landsat archive data from 1982 (c. 1 250 000 scenes in total for the tropics). The approach allows detecting tree cover disturbances that are visible in 0.09 ha size pixels - including disturbances from selective logging and fires that can be visible only during a short period -, and to map remaining moist forests without any visible sign of disturbances during the available observation period.  An annual change dataset is also provided depicting the spatial extents of TMF and disturbances for each year.

4. Suggestions to improve the reporting on primary forest area and its changes in humid tropical regions:

* We would need more information on the spatial distribution of historical disturbances. The large geographical and temporal unevenness of the Landsat archive prevents robust monitoring of disturbances before the year 2000 in some countries and consequently consistent monitoring among countries.  However, consistent monitoring is possible during the last 20 years over the full tropical belt.  Expert knowledge could complement the RS-derived maps when historical data are missing, to possibly exclude the forests that have been falsely identified as undisturbed based on ancillary historical data.
* Finer spatial resolution data are needed to capture smaller disturbances (e.g. removal of small single trees). Sentinel 2 data (0.01 ha size pixel) will significantly improve the detection of disturbances but such data exist only since the year 2016 and operational products are not yet existing on the continental/global scale.

5. FAO can help the countries by collecting and providing them access to the most relevant information, in particular, access to historical satellite imagery or existing products (maps of undisturbed forests) and by giving them support for using this information (i) technically, and (ii) by providing some guidelines to ensure consistency among countries.

## Mila Alvarez Ibanez, US Department of Agriculture, Forest Service, United States of America

Thank you for the opportunity to contribute to this exiting effort and the great work already accomplished. Following are my insights after reading the paper.

**What exactly is FAO trying to measure under their definition of Primary Forests?** The definition of primary forests is an attempt to envision how forests look like and evolve in the absence of humans or in the presence of human population levels that are perceived as not having an impact on the environment (as a read the exception for indigenous communities). However, we all know that this far from reality. Humans, indigenous or not, have an impact in forests, even in those cases where their presence is remote. Climate change is a good example, as the paper addresses. Another example of indirect impact is when human action pushes species to move to areas less influenced by humans, becoming habitat competitors to other species. This is the cases of the Northern Spotted Owl (Strix occidentalis caurina) and the Barred Owl (Strix varia) in the U.S. The Northern Spotted Owl was listed as “threatened” species in 1990, which lead to changes in land management throughout the U.S. Pacific Northwest and northern California, primarily by curtailing logging of old forests, the owl’s preferred habitat. The assumption was that by reducing habitat loss, primarily on federal lands, population numbers will recover. However, after nearly two and a half decades of protection under the Endangered Species Act, the spotted owl is not showing signs of recovery and, in fact, its situation has worsened. This is due to the arrival of the barred owl, a historical resident of the U.S. eastern forests. At some point less than 100 years ago, barred owls began dispersing towards west. It’s believed that this was due, at least partially, to changes in habitat caused by a cessation of Native American burning in the plains after Europeans and other foreigners arrived. Lack of fire allowed trees to grow creating habitat “bridges” across the plains that facilitated barred owl movement. Barred owls were first reported in northern British Columbia in 1949; today they overlap the entire range of the northern spotted owl. As a result of the barred owl migration to the west and their biological advantages over the spotted owl, populations of spotted owl are rapidly declining in many areas.

The extend of human footprint on the environment is broad and complex both in space (scale, direct and indirect impacts) and time. Given the latest adopted definition states: "Naturally regenerated forest of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed." The definition is confined to human visibility/perception. Does the definition focus on forest appearance to the human eye or on ecological resilience/health (significantly disturbed)?

Philosophically, Primary Forest attempts to capture those forest tracks that remain “pristine”, “virgin”, “not exploited/modified by humans”. The definition embraces the underlying assumption that human impact is negative (or at least not as good as nature), but in some cases human action is ecologically beneficial. What is the ecological difference between a natural disturbance and a silvicultural prescription that mimics nature? For example, is there any difference between a natural low intensity fire and a prescribed fire? If human intervention through silvicultural practices can accelerate forest successional stages, why this is not capture in the given definition.

**Recommendation**. Reporting on measurable characteristics (or metrics) attributed to primary forests conditions rather than on a broad definition left to country interpretation would improve the comparability of reported data at the global level and its use for decision making. Intact Forests Landscapes (IFLs) represent a good practical attempt to measure some of the related characteristics (lack of fragmentation in large tracks of forests) that exist in many primary forests. Although IFL mapping criteria excludes all burned areas regardless of their origin, human or natural, and their 500 km2 threshold was a subjective mapping criteria decision based on the best knowledge at the time, it provides an estimation of where large areas of unfragmented core habitat free of visual human impact exist, a forest characteristic that exists within primary forests as defined by FAO.

Because of the different nature and characteristics of the many biomes on Earth and the forest ecosystems within them, criteria to measure some primary forest’s characteristics might need to be adjusted to biome or appropriate scales.

**Resources**. Any reporting mechanism must acknowledge the differences among the countries’ financial resources to conduct forests estimations and inventories. Reporting on agreed primary forests characteristics could adopt a “tier approach”, where the accuracy of the data increases as we go down in the defined tiers. This would allow countries with fewer financial resources to report comparable numbers to countries with more financial resources.

Tiers could be defined for as many primary forest characteristics as are agreed. In the case of estimating unfragmented forest area, the following tier approach could be modeled:

1. *Tier one* – gross estimations as defined by IFLs or other mapping criteria identified for remote sensing analysis and using imaginary that is currently readily available and free.
2. *Tier two* – estimations of unfragmented forest area based on remote sensing analysis (tier one) and ground inventory data.
3. *Tier three* – precise estimations that combine inventory information with high-resolution remote sensing data and/or airborne data (lidar, hyperspectral, camera, etc.) that might not be freely available and might require more advanced processing and computing technology.

In conclusion, countries could report on acres of forest presenting each of the quantifiable and measurable characteristics associated to primary forests (unfragmented forests, undisturbed forests, etc), perhaps tailored to a biome scale, rather than total acres of primary forests using a general definition subject to country interpretation and political drivers.

## Patrick Norman, facilitator of the discussion

Dear members of the FAO forum,

I’d like to start with a special thank you to all those who have contributed to the forum so far and it is great to see the growing amount of participation. This week there have been many important and thought-provoking points raised. Several commentators have discussed the need for clear thresholds around how much disturbance or the interval of time since disturbance, results in forests not being considered primary. On this topic respondents have raised points, such as the need to consider all human disturbances and at what point does old/ancient damage stop being and important consideration when defining primary forest.

Another issue commonly discussed was the monitoring periods of remotely sensed datasets. In particular the limited timeframes of satellite data for some countries, as this influences the feasibility of these techniques for long-term monitoring of primary forest in these regions.

Although these have been some of the most common discussed topics, the wealth of feedback received was much broader and more detailed. Many thanks to all commentators for their time and effort put into this consultation so far. Over the last five days of the consultation period we welcome and greatly appreciate any further comments and feedback.

Thank you and kind regards

Patrick Norman

## Ruslan Lamberto Ndje Nzo Angue, Ministerio de Agricultura, Ganaderia, Bosques y Medio Ambiente, Equatorial Guinea

Original contribution in Spanish

Buenas tardes queridos colegas,

Nosotros aquí en Guinea Ecuatorial, utilizamos la definición de la FAO, es decir, el bosque empieza con 0,5 ha con una cobertura forestal de 10% y altura de los árboles de 5 metros. Es una definición que nos vas a la perfección en cuanto a los bosques primarios se refiere, pero sin embargo, todo lo que son bosques secundarios serían más adaptables con una altura de aboles de 3 metros, porque con el proyecto Regional REDD+ y los Créditos de Carbono, estos árboles también almacenan una importante tasa de carbono, además hay muchos países que también han definido la altura de sus árboles a 3 metros. Pienso que también se debería reflexionar en cuanto a eso.

Muchas gracias

**English translation**

Good afternoon dear colleagues,

Here in Equatorial Guinea, we use the FAO definition, that is, that forest starts with 0.5 ha with a forest cover of 10% and a tree height of 5 meters. It is a definition that suits us very well as far as primary forests are concerned. However, regarding secondary forests it would be more suitable to consider height of 3 meters, as with the REDD + Regional Project and the Credits of Carbon, these trees also store an important carbon rate. In addition, there are many countries that have also defined the height of their trees at 3 meters. I think you should reflect on that.

Thank you

## Philomena Tuite, Kenya

The report is strategic and has substance for a diverse audience.

In terms of gaps, I see mapping of suffrutex life forms in floristic groups or the centres for suffrutex (geoxylic) diversity, such as in the miombo (Africa south of the equator) and the Brazilian Cerrado. In the Zambezian floral domain with at least 121 geoxylic species described, there are endemic species and many of the families represented above ground, even some canopy species, lie in the subterranean flora including Rubiaceae and Anacardiaceae. These include important miombo flowering canopy species such as Syzygium guineense and Parinari sub species.

It may be meaningful to note the reality of geoxylic diversity not least in quite compact woodland types such as the Miombo across at least 7 countries south of the Equator in Africa - below and above ground. In the context of climate change narrative, biodiversity and genetic pools, refuges and endemism alongside resilience for adaptation this is an important resource.

Practically speaking, as the mapping process delineates types and extent, woodlands such as the Miombo and Cerrado in Brazil, further work to recognize and value the underground suffrutex vegetation provides a more realistic picture.

The above is based on personal experience of research and bilateral work in Miombo ecozone, although a few years ago. Phil. Tuite (PhD)

## [Leonardo Daniel Boragno Rodriguez](http://www.fao.org/fsnforum/member/leonardo-daniel-boragno-rodriguez)****,**** Dirección General Forestal- Ministerio de Ganadería Agricultura y Pesca, Uruguay

Original contribution in Spanish

1. Desde Uruguay se entiende el concepto y el alcance mundial de la definición planteada por FAO y la Convención sobre la Diversidad Biológica (CDB), estando de acuerdo en la mayor parte de la definición.

Para el caso de Uruguay existen características propias que han determinado el grado de conservación de los bosques. Una de las principales es que cerca del 90 % de los mismos, se encuentran asociados a establecimientos productivos agropecuarios lo que hace difícil encontrar bosques sin intervención humana.

Por lo tanto, compartimos el concepto de ESPACIO TEMPORAL SIN SUFRIR ALTERACION DE LOS MISMOS, y es por esto que se debería definir el período de tiempo a considerar, entendiendo que el mismo depende del tipo de bosque, el grado de alteración o intervención sufrido, su latitud y el poder de resiliencia. Consideramos que en ningún caso podría ser menor a 50 años. Dichos períodos deberían discutirse en los talleres regionales.

2.Creo que el mismo es lo suficiente extenso, como disparador de la discusión, los talleres regionales aportaran diferentes visiones.

3. Se utilizan los datos recabados en el Inventario Nacional Forestal y las diferentes cartografías históricas disponibles, los datos existentes en el registro nacional de Bosques y la experiencia y el conocimiento de especialistas nacionales referentes en estos temas (incluida la Universidad).

4. A nuestro entender cuanto más desagregados están los datos solicitados, se consigue más precisión en la información. Además, esto supone un autovalidación de la misma, lo que permite un mejor control.

Es decir, si se solicita, por ejemplo:

Áreas de bosques intervenidos o manejados recientemente.

Áreas de Bosques sin intervención y sin presencia de fuego en los últimos xxxx años

Áreas de bosques primarios

Áreas de bosques con manejo sostenible por comunidades indígenas.

Indirectamente estas reforzando el concepto de la categoría deseada.

5. FAO debe seguir en su empeño de mejorar la calidad de los datos, para ello recomendamos una mayor presencia in situ de sus técnicos, esto les permitirá entender la dinámica de los bosques y no tener percepciones teóricas o respuestas exclusivas de los corresponsales. Es necesario validar mejor la información.

Si bien se entiende el histórico planteo de que los reportes nacionales son elaborados por expertos nacionales, en algunos países hemos tenido la percepción de que la problemática de nuestros bosques, junto con aspectos sociales y políticos no siempre es comprendida por los organismos internacionales, lo que hace que la unificación de datos a nivel internacional sea una tarea compleja y que dista de la realidad.

Creemos importante la realización de talleres regionales de intercambio técnico que faciliten la comprensión de los distintos bosques y armonización de indicadores de bosques similares. Con esto no se está planteando realizar auditorias, sino ayudar en la validación y compilación de datos.

Una iniciativa de FAO que creemos correcta apoyar es la referida a la armonización de inventarios forestales según regiones, que actualmente está en proceso de formación de los grupos de trabajo, a la cual se le puede anexar la discusión de definiciones.

## Kari T. Korhonen, Luke, Finland

1. Is the FAO definition on primary forest (FAO, 2018) adequate to your national/regional/global assessment and reporting purposes? If not, what criteria would you like to add/remove from the FAO definition? No. All the relevant criteria are probably inccluded in the definition, but the definition is not operative

2. Perhaps not fully missing but species composition and dynamics is poorly discussed, as compared to canopy cover, for example.

3. NFI Field observations

4.In our case we should combine Remote Sensing data with the field data to consider spatial issues

5. By providing regionally more concrete criteria and thresholds

## [KBN Rayana](http://www.fao.org/fsnforum/member/kbn-rayana)****,**** JNU &IAMMA Institute of Agric. Mktg, Mgt., & Admin, India

Defination given was identified for primary forests, which needs to include agro-forestry a world along ith existing defination since most of the Indian farming started with Shifting cultivation by people in ancient days causes reducing the forest land. Therefore redefine defination.

if you need help I will be available

2. Major issues missing is as indicted above missing of Agroforestry, which is tree plantation including fit for grazing of livestock/feed to enable to maintainable sustainable one.

In addition to this encourage the farmers who wanted to go for developing forestry/agroforestry to develop forestry consists of flora funa and predators. This will help out crubbing pests like Locusst/grasshoppers its control...

it preserves even rainharvessted water to be used as watersheds to incrreeasse the ground water levels.

encouraging local youth employment...

3.Methods of assesing area through Data -- 1. satalite data

2. local revenue staff /agricultural staff collected data -- this daata is more accuracy and involvess encourage the farmeers in the activity,,

4.Data which is more useful one the obtaining regional daata through local governments rather than use of satalite data. This data not only includes local area but also activities in the field along with beneficiery/s details also available ..

5. By bove to develop this an officer at junior /consultant will be appointed in the developing and developed countries and can coordinate and develop the full details on  the project and report with his remarks with impact. Guidliness will be given to such officrs how to evaluate and monitor it.

by

prof. Dr. K B Na Rayana

Jaipur national university and IAMMA

India.

## [Andrei Iugov](http://www.fao.org/fsnforum/member/andrei-iugov)****,**** ФБУ ВНИИЛМ, Russian Federation

**Original contribution in Russian**

Добрый день. В Российской Федерации имеется несколько определений терминов «девственный» (первичный, коренной) лес. Одно из них приведено ниже.

«Естественный лес, не испытавший заметного антропогенного воздействия, изменяющийся на протяжении многих поколений лесообразующих древесных пород под влиянием природных процессов» (Энциклопедия лесного хозяйства 2006)

Все определения имеют описательный характер. Насколько нам известно, примерно, такая же ситуация и в других странах. Определение ФАО в ГОЛР 2020 так же имеет описательный характер. Это затрудняет проведение учета по площадям, который предусматривается в ГОЛР.
Мы считаем, что нужны численные параметры, позволяющие относить лесной участок к девственным или вторичным лесам. Например, размеры участка, происхождение, период, за который участок не испытывал воздействия человека и пр.
Одним из примеров такого подхода является определение термина малонарушенные лесные территории и малонарушенные леса, сформулированное ВВФ.

МЛТ — это эталоны дикой природы. Составляющие их экосистемы развиваются и сменяются по естественным законам, создавая условия для существования видов флоры и фауны в естественной среде обитания (даже таких требовательных, как крупные хищные животные).

Термин МЛТ используется в международном переговорном процессе по лесам, например, в Конвенции ООН по сохранению биоразнообразия.

В любом случае, с учетом международной значимости вопроса, проведение консультаций под эгидой ФАО является полезным.

English translation

Good afternoon. In the Russian Federation there are several definitions for the terms “virgin” (primary) forest. One of them is provided below.

“A natural forest that has not experienced a noticeable anthropogenic impact, changing over many generations of forest-forming tree species under the impact of natural processes” (Forest Encyclopedia 2006)

All definitions are descriptive. As far as we know, approximately the same situation is in other countries. The FAO definition in GLOBAL FOREST RESOURCES ASSESSMENT (FRA) 2020 is also descriptive. This makes it difficult to carry out the accounting on the areas provided for in the GLOBAL FOREST RESOURCES ASSESSMENT (FRA).

We believe that numerical parameters are needed that make it possible to attribute the forest area to primary or secondary forests. For example, the size of the site, the origin, the period during which the site did not experience antropogenic impacts, etc.

One example of this approach is the definition of the term of intact forest landscapes and intact forests as formulated by the WWF.

IFL are wildlife models. The ecosystems that compose them develop and are replaced based on natural laws, creating conditions for the existence of species of flora and fauna in their natural habitat (even such demanding ones as large predatory animals).

The term of IFL is used in the international negotiation process on forests, for example, in the UN Convention on Biodiversity Conservation.

In any case, given the international significance of the issue, carrying out consultations under the auspices of the FAO is useful.

## Claudiu Zaharescu, Ministry of Environment, Waters and Forests, Romania

1. Is the FAO definition on primary forest (FAO, 2018) adequate to your national/regional/global assessment and reporting purposes? If not, what criteria would you like to add/remove from the FAO definition?

*The definition is acceptable but has a certain dose of subjectivism/contradiction, as long as it ”includes both pristine and managed forests (that meet the definition)”.*

*So, ”managed forests” are supposed to be those in which ”traditional forest stewardship” currently take place (inevitably by harvesting wood/forest products), but invisibly and in the same time with „no known significant human intervention”.*

*The pristine forests are well defined and documented in Romania further to clear criteria and indicators established by law, which are checked during specific studies (developed also based on a regulated methodology), or during the forest management plan review, which resulted in the National Catalogue of Virgin and Quasi-Virgin Forests.*

*Accounting for the rest – the managed forests (the ”soft version” of pristine forests), seems not to be an easy mission and should be based on a compromise, difficult to be statistically recorded/reported.)*

2. Is the background paper missing any major issues? If yes, please specify.

*In the chapters 1. Introduction and 2. Current reporting on primary forests some approaches/methodologies for data collection and evaluation of more or less experimental primary forests from ex-European countries are mentioned, but nothing is mentioned about the approach of the countries from the Carpathian region in Europe, signatories of the FRAMEWORK CONVENTION ON THE PROTECTION AND SUSTAINABLE DEVELOPMENT OF THE CARPATHIANS. The Carpathian Convention created the framework for the adoption and harmonization of sustainable forest management in the region and, in particular, for the protection of the pristine forests of the Carpathians. Thus, under the "Protocol on sustainable forest management", adopted in Bratislava, on May 27, 2011, one of the activities by which the States parties contribute to the achievement of the objective of the protocol is to carry out activities and to cooperate for "identification and protection of natural, especially virgin forests". In this respect, on the occasion of COP4 of the Convention, Parties adopted "Criteria and indicators for the identification of virgin forests in the Carpathians and a common format for data collection and mapping". The activities are currently underway for inventory and protection of virgin forests.*

*It can be stated with certainty that at present, the Countries Party to the Carpathian Convention have the most comprehensive legal framework regarding the protection of virgin forests. Romania actively contributed to the elaboration of this regional framework, considering the criteria and indicators that it has already developed and used.*

3. Which methodology and data, if any, do you use to assess primary forest area and its changes?

*The methodology used in Romania to assess pristine forests (virgin and quasivirgin forests) is approved by a Ministerial Order/2012 and is based on indicators grouped under two criteria:*

*a. Naturalness*

*b. Surface size and borders*

*Regarding the primary forest, we chose the variant of the forests with special protection function, under a functional type with specific management according to which forest works are not allowed by forest management plans, due to functions to be met by respective forests, but there is no guarantee of 100% fulfilment of all the conditions in the definition.*

4. Which methodological changes would be needed to improve reporting on primary forest area and its changes at national, regional and global levels, with particular emphasis on improving consistency among countries?

*Establishing some indicators, like the minimum surface of a primary forest, for instance, or establishing common methodologies on ecological or biogeographical regions, but the more complex the definition / method, the harder it is to inventory/identify such forests.*

5. How can FAO help countries improve their reporting on primary forest?

*Defining a small set of indicators derived from definition, with a minimum number of indicators to be met by countries under a certain flexibility, adapted to their specific,*

*It is important for countries to present the criteria that are used to identify and map primary forests, to reflect the robustness / consistency of the data used in reporting.*

## Jing Yang, FRA National Correspondent, China

Dear colleagues,

We, Prof. Zeng Weisheng, Prof. Gao Xianlian and I, have carefully read the background paper on primary forest and the contributions on-line. Combining with the properties of forest resources in China and the situations of forest resources assessment for FRA2020, some opinions are presented for reference as follows:

On the background paper. The background paper is a review document with rich information, which not only clarified the background of improving the primary forest reporting in the 2020 global forest resources assessment, but also outlined the current situation of primary forests reporting and the international efforts related to measuring and mapping primary forests, and finally presented some options for improving operational methods and guidance for data collection and reporting on primary forests. Therefore, we should thank Professor Patrick Norman and his colleagues at first for their efforts on drafting the background paper. Of cause, just as some experts have stated, the background paper needs to be improved further.

On the definition of primary forests. As stated in the background paper, the FRA 2015 definition of primary forest is a reasonable statement and consistent with how the term is used in the scientific literature, but we still think the definition remains vague and abstract. In the FRA 2020 terms and definitions, supplementary explanations of what is included and what is not included have been added to make the definition of primary forest clearer. The definition is a little bit more specific, but the argument is also appeared. For example, are traditional activities by indigenous people not human disturbance, and can the forest still be considered as primary forest after fire? Generally, the more abstract, simpler definitions are easier to agree on, while the more complex, concrete definitions are more likely to be controversial. Since the definition of primary forest cannot be expressed by specific inventory variables, countries will inevitably have inconsistent understanding and practices in the reporting process. The percentage tree canopy cover and height thresholds use to delineate forest from non-forest vegetation. How to set the thresholds for primary forest is a challenge. It would be very difficult for countries to undertake forest assessments on an eco-regional basis, to specify the forest canopy cover and height thresholds for each forest type, and to then establish baseline characteristic values for primary, secondary and degraded forests in a short period. Furthermore, besides the two factors of canopy cover and height, the attributes of anthropogenic influence, ecological characteristics and vegetation structure should also be taken into account in the definition of primary forest. In addition, further consideration is also needed regarding questions of spatial scale or minimum area and other controversial issues in assessing primary forests, such as, whether or not human disturbance should be treated differently between indigenous people and other people, whether the effects of fire are natural or human disturbance?

On the purpose of primary forest reporting. As Ms. Sonja Oswalt from USDA Forest Service stated, firstly we should be informed “why we want this”, or the purpose of primary forest reporting. It is because the definition of primary forest and the method of obtaining primary forest data are highly relevant to our goal. For example, do we care about anthropogenic influence or ecological characteristics of primary forest? If it is the former, we can focus on the "undisturbed forests", and obtain the relevant data by using remote sensing techniques; and if it is the latter, the situation is much more complicated because different forest types have different ecological characteristics. Some experts have suggested conduct forest resources assessment on a bio-regional or eco-regional basis, which would be difficult to implement only based on remotely sensed data. Viewing from forest inventory and global scale, we think we should prefer the former. For the assessment of clearly visible human activities on forests during the near period or the last 20 years, we can use the full Landsat archive data to conduct monitoring, just as stated by Christelle Vancutsem and Frederic Achard from Joint Research Centre, European Commission. Considering the differences among the countries’ financial resources, the “tier approach” suggested by Dr. Mila Alvarez Ibanez from USDA Forest Service, could be referenced to reporting on primary forests characteristics, which defined 3 tiers with different accuracy of the data.

On primary forest data of China. The data of primary forests in the country report of China submitted to FAO were from the National Forest Inventories, which were obtained from experts’ assessment based on the variable “degree of naturalness”. The “degree of naturalness” is an index that reflects the degree of forest naturalness by considering the attributes of anthropogenic influence, ecological characteristics and vegetation structure. From primary forests to plantations, there are 5 grades of “degree of naturalness”. In our original sense, primary forests are those with grade I of “degree of naturalness”. However, due to the vagueness and abstraction of the criteria of naturalness and the lack of clear quantitative indicators, inconsistent understandings and practices had appeared in the field work, resulting in unsatisfactory inventory results. That is, some of the grade I forests classified by the field teams are obviously not primary forests, and some of the grade II forests are probably better to classified into primary forests. Finally, after expert analysis and evaluation, 85% of grade I forests and 20% of grade II forests were identified as primary forest area.

On primary forest mapping. The national data of many countries, including China, used for FRA 2020 are derived from NFIs’ data, which are hard to be drawn upon map. Even for total forest area, the NFI data are hardly consistent with the sum of data from forest management inventories. Unless the definition of primary forest is based on a small number of measurable characteristic variables (such as area, height and canopy cover), and the primary forest reporting is carried out by means of mapping based on remote sensing, the consistency between statistical data and map area is difficult to be achieved.

In summary, it is a challenging task to improve the definition of primary forest and its reporting methods. Although we can’t attend the workshop to be held in March in Canada, we will continue to pay attention to the progress of the expert consultation on Improved Reporting on Primary Forests. I wish this workshop every success.

Jing Yang

FRA National Correspondent from China

## Blaise Bodin, Secretariat of the CBD, Brazil

Dear colleagues,

Please find below a contribution on behalf of the Secretariat of the Convention on Biological Diversity.

**1. Is the FAO definition on primary forest (FAO, 2018) adequate to your national/regional/global assessment and reporting purposes? If not, what criteria would you like to add/remove from the FAO definition?**

The current Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets include Target 5, which reads “By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced”.

“Natural habitats, including forests” includes “forests as natural habitats” among other ecosystems. This wording does not match a specific category of the FRA such that it could be used as an obvious indicator. The ‘naturally regenerated forests’ category of the FRA may encompass forests as natural habitats, but permits a level of disturbance that may be detrimental to some species. The definition of primary forest proposed for the FRA refers to a number of criteria that are characteristic of forests as natural habitats (lack of significant native species loss; lack of disturbance of ecological processes; presence of natural forest dynamics; natural tree species composition; occurrence of dead wood; natural age structure; occurrence of natural regeneration processes), making that category of the FRA very adequate to global assessment and reporting purposes under Aichi Biodiversity Target 5.

This target will likely be replaced in new global biodiversity framework is under discussion, to be adopted at CBD COP 15 in October 2020. The targets proposed under the ‘Zero Draft’ of the new framework are still to be negotiated and will likely incur substantial changes, however they refer to “no net loss”, “retention and restoration”, “integrity”, “intact areas”, “wilderness”. If such targets are adopted, a global indicator of primary forests would be extremely relevant, as an indicator of the integrity of ecosystems, to ensure that the achievement of these targets is not based upon large-scale replacement of primary forests with younger or more modified forests that do no have the same value for biodiversity.

A monitoring framework with indicators is being developed as a supplementary component of the new biodiversity framework, which mentions as a suggested element for the monitoring the “Change, and rate of change, in extent of natural ecosystems and biomes (overall, for each biome/ecosystem type, and for intact areas, e.g. primary forests)”, and as a potential indicator for that element “Trends in primary forest extent”. This relevance hopefully explains the 'why' of wanting to improve data under this variable of the FRA, in response to the comments made by Sonja Onswalt.

As the report points out, the definition of primary forests proposed by the FRA is consistent with how the term is used in the scientific literature. From the standpoint of global assessment and reporting under the CBD, the criteria proposed are a good enough fit for the concept of “forests as natural habitat” under ABT 5. Rather than adding or removing criteria, the focus should be on making sure that they are used consistently by countries when providing figures on primary forests in their FRA reports. Instead of relying on broad tiers of accuracy, the reporting format for this category could include information on which of these criteria have actually been applied in the methodology used to estimate primary forest extent.

The wording of some of the criteria may also need to be reviewed to avoid and/or clarify ambiguous terms. For example “significant species loss” begs the question of what threshold should be used to consider that species loss is significant enough that the criterion cannot be met. Similar to the other thresholds discussed in the report (canopy height, canopy cover), this may need to be defined separately for different forest biomes/realms.

Since implementation of the globally agreed targets currently negotiated through the CBD process happens through national actions, the existence of time series data on primary forest at the national level is also of use to the CBD process. Having this information can help countries set ambitious, yet realistic targets, based on knowledge of previous rates of primary forest loss. The objective of the series of workshops to strenghten the capacity of governments to make use of the most recent and accurate datasets is therefore aligned with the capacity-building efforts of the CBD Secretariat towards the adoption of more specific national targets for ecosystem loss and restoration, including forests.

**2. Is the background paper missing any major issues? If yes, please specify.**

The paper does a good job of reviewing currently available datasets but seems to fail short of making more concrete recommendations on which of those could be used to specifically address the criteria of the definition. It recommends that a “minimum attribute dataset” be defined to assess primary forest extent but does not list concrete recommendations for data that could be used for that purpose – will this be decided during the workshops?

A summary table would have been useful to present specific datasets/methodologies against each of the criterion of the definition, possibly differentiating between different regions. This could be the expected outcome of the workshops, but it may be more realistic to start them with clearer proposals to use as a basis for the discussion.

The report could also draw further on the review conducted by the Secretariat of the CBD in 2018 of national FRA reports, which highlighted the discrepancies in the methodologies currently used to estimate primary forest extent, and the departure from the criteria listed in the definition. This is relevant background information for example to complement the information in Table 5. It does not make sense to compare the FRA reporting amongst countries and against available global datasets if the criteria they have used to define primary forests are completely different (some countries e.g. Russia look at lack of disturbance while others simply use the area of forest under protected status – which is often not a guarantee of no disturbance!).

This information is also important to assess the reluctance that there may be to adopting new methodologies that could completely contradict previous data and trends reported by a country under this variable.

One point missing from the report, but perhaps for clarification by the FRA team, is also the question of retroactivity of the application of harmonized/improved methodologies – Will a new time series data of primary forest extent be started from FRA 2020 or will data previously submitted be revised? How to ensure consistency not just across countries/regions but also over time in the reporting of this data?

**3. Which methodology and data, if any, do you use to assess primary forest area and its changes?**

The 5th edition of the Global Biodiversity Outlook relies, among other indicators, on the ‘primary forest’ category of the FRA to assess progress under Aichi Biodiversity Target 5. While the FRA data is used to determine that the target has not been met, the exact reference is actually to the 2015 article by Morales-Hidalgo et al., which extracts figures at regional level from the FRA category on primary forests but also points at the inconsistencies in the application of the methodology and potential issues with the data.

In short, while the limitations of the FRA data on primary forests are well known, there does not seem to be an alternative indicator readily available at the global level. For intergovernmental processes such as the CBD, the value of the FRA resides not only in its global coverage but also in its acceptability to national governments since all the data points have been formally approved.

**4. Which methodological changes would be needed to improve reporting on primary forest area and its changes at national, regional and global levels, with particular emphasis on improving consistency among countries?**

See response under question 2.

**5. How can FAO help countries improve their reporting on primary forest?**

FAO could encourage closer coordination FRA national correspondents andCBD Focal points working on their reports to the CBD, to make the most of the potential for synergies between the two reporting processes. Many of the biodiversity indicators used by Parties to the CBD may be of relevance to apply the criteria of the definition of primary forests in the FRA and much of the data collected for one process could be relevant for the other.

We look forward to the outcomes of this consultation and workshop series.

## Patrick Norman, Griffith University, Australia

Dear members of the FRA forum,

What an incredible way to finish the e-consultation, with so many thorough and thought-provoking comments being submitted over the final few days. As the forum comes to a close, I’d like to express a big thank you to all those who have contributed, on my behalf as well as that of the whole Global Forest Resources Assessment (FRA) Programme.

The next step of the process will be to analyse and assess the feedback received on the forum and with our best efforts, integrate these into the final version of the background paper. In order to ensure that we get the correct representation of respondent’s comments, we may be in contact with you for clarification.

The final version of the report will be shared on this platform as well as being discussed at the first workshop, for the boreal biome, scheduled for March 17-19, 2020 in Ottawa, Canada.

Kind regards,

Patrick Norman

## Helga Vierich-Drever, Yellowhead Tribal College, Canada

I am concerned by the label "primary forests" - I assume it means climax forest, especially "old growth" containing trees at least half as old as their lifespans. Often, the implication is that this kind of forest has not been subjected to significant disturbance by human activities, such as logging, and that the species composition has not been affected by humans either. Old growth forests have some of the most commercially valuable timber, but occupied land that could be used for second-growth stands that grew more quickly and could be harvested more frequently. For example, in British Columbia, Canada, harvesting in the coastal region is moving to such second-growth stands.

There was a scientific symposium in Canada in 2001 that found difficulty in developing a rigorous scientific definition. I believe the results are available in the FAO data base: at the following: <http://www.fao.org/3/xii/0042-b1.htm> They concluded: "...Concerns over old-growth conservation go well beyond the more traditional areas of watershed (including water quality) and habitat protection, and includes emerging issues such as the conservation of genetic resources and carbon sequestration. Conservation of old growth is very much a cross-sectoral issue with many interdisciplinary linkages. It is important to dispel the notion that concerns about the disappearance of old-growth forests from our landscape are simply the preoccupation of environmentalists. It is an important issue with implications for ecological science, the long-term health of our forest economy, and our quality-of-life. It is time for the wider forestry community - the forest sector as a whole - to embrace this issue in a more serious way and to take up the cause of old-growth conservation."

My own research, while I was a principal scientist at the International Crop Research Institute for the Semi-Arid Tropics, was partly focussed on the issue of forest uses. I found that, in almost every case, both patches of climax forest, and the mosaic of secondary growth, were generally constituted the ecological "commons" of each community we studied in the Sahel. These appeared to be critical, moreover, in the maintenance of water tables, and in preventing both rainy season flooding and erosion and in preventing dry season failure of wells and other sources of water. As population increased, and, more significantly, as acreage devoted to commercial crops increased, the percentage of land returned to the commons, after a period of cultivation, was falling during the 1980s, and has fallen subsequently. My colleague, agronomist Willem Stoop, and I wrote on this here: <https://www.sciencedirect.com/science/article/pii/016788099090214X>

In the long run, it became clear that both nomadic pastoralism and slash and burn (long fallow) farming economies tended to produce mosaics of ecological diversity - in forested zones, this resulted in a complex of about 20-25% cleared land growing crops and 80% land in secondary growth. This secondary growth represented various stages from pioneering annual grasses and "weedy" plants, through early pioneering shrubs and trees, through to early stages marking the re-establishment of some of the climax tree species that would eventually become old growth primary forests if left alone. Sacred groves of such ancient trees were found in all the village territories. I suspect that these are essential to the overall process of restoring soil nutrients, for it was in symbiosis between these species and various underground fungi that nutrient capture was completed.

Elinor Ostrom found that the preservation of these areas of forested commons was an essential aspect of long term sustainability even where more intensive agriculture had developed, and emphasized the importance of local management - and control - over the degree of harvesting of trees and other forest products. See <http://www.onthecommons.org/magazine/elinor-ostroms-8-principles-managing-commmons> and <https://www.youtube.com/watch?v=LqC7xG8fxHw>

I hope this little contribution of mine is not too late to be of use.

sincerely, Helga Vieirch